REF. COPY A54E

Waste Reduction Office
Initiatives Paper No. 4

MEASURING PROGRESS TOWARDS ONTARIO'S WASTE REDUCTION TARGETS

REDUCE
REUSE
RECYCLE

Ontario
Environment
Environnement

REF. COPY R54E

Waste Reduction Office
Initiatives Paper No. 4

MEASURING PROGRESS TOWARDS ONTARIO'S WASTE REDUCTION TARGETS

REDUCE
REUSE
RECYCLE

Ontario
Environment
Environnement

Waste Reduction Office Initiatives Paper Series

PIBS 1708E Initiatives Paper No. 1: Regulatory Measures to Achieve Ontario's Waste Reduction Targets, October 1991

PIBS 1882E Initiatives Paper No. 2: Waste Management Planning in Ontario, March 1992

PIBS 1882E-02 Municipal Waste Management Powers: A Discussion Paper, March 1992, Ministry of Municipal Affairs in conjunction with the Ministry of the Environment

PIBS 1954E Initiatives Paper No. 4: Measuring Progress Towards Ontario's Waste Reduction Targets, June 1992

*** Disponible en français**

Copies of the Initiatives Papers May Be Ordered From:

Public Information Centre
Ministry of the Environment
135 St. Clair Avenue West
Toronto, Ontario
M4V 1P5

(416) 323-4321 or
1-800-565-4564
FAX: (416) 323-4564

Direct Queries or Comments To:

"Initiatives Paper 4"
Waste Reduction Office
Ministry of the Environment
135 St. Clair Avenue West
Toronto, Ontario
M4V 1P5

This paper is unbleached and contains 100% post-consumer fibre
Printed with organic ink

© Queen's Printer for Ontario, 1992
PIBS 1954E
ISBN 0-7729-9935-X

EXECUTIVE SUMMARY

This is the fourth in a series of Initiatives Papers discussing topics related to reducing and managing Ontario's wastes. The paper was prepared by the Waste Reduction Office of the Ministry of the Environment, following discussions with municipal, federal, provincial, and private sector waste managers and environmental officials.

Initiatives Paper No. 4 provides guidance for monitoring progress towards achieving the Province's waste reduction targets. It explains the targets, and discusses factors affecting their measurement such as types of materials, units of measure, and monitoring points in the waste management system. It also discusses application of the targets for planning purposes. These topics are all linked to the development of a waste management information system.

The Government of Ontario has established targets to decrease waste going to disposal by at least 25 per cent in 1992 and at least 50 per cent by the year 2000 compared to the base year of 1987. In February, 1991, the Minister of the Environment announced the *Waste Reduction Action Plan*, aimed at accelerating efforts across Ontario to reduce the amount of waste going to disposal. Implementation of the *Waste Reduction Action Plan* through the 3Rs (reduction, reuse, recycling) programs is being coordinated by the Waste Reduction Office, established in 1991 within the Ministry of the Environment. The 3Rs of waste management help to divert recoverable material from disposal to productive uses in the economy.

Ontario's waste reduction targets apply to non-hazardous solid wastes "traditionally" managed by disposal at landfill, dump, and existing incineration facilities. They are expressed relative to the tonnes disposed of in the base year 1987. Various factors, such as flucutations in population, economic growth, and international trade affect the accuracy with which the diversion quantities can be calculated. The Ministry is developing models that take these factors into account when reporting diversion figures.

The targets apply to planning and monitoring progress in the province as a whole. However, both the municipal and the industrial, commercial and institutional (IC&I) sectors expressed interest in planning and monitoring their individual contributions. To satisfy these needs, the Ministry developed two ways to measure progress towards achieving the waste reduction targets for any particular year.

The ***Per Capita Diversion Rate*** is calculated as follows:

$$\frac{\dfrac{\text{1987 Waste Disposal}}{\text{1987 Population}} - \dfrac{\text{19-- Waste Disposal}}{\text{19-- Population}}}{\dfrac{\text{1987 Waste Disposal}}{\text{1987 Population}}} \times 100$$

where "Waste Disposal" is measured in tonnes.

The Ministry uses this formula to monitor progress at the provincial level. The formula can also be used by municipalities to monitor their progress in achieving the same provincial targets applied at the municipal level.

The second method is the **Absolute Diversion Rate**, calculated as follows:

$$\frac{\text{1987 Waste Disposal} - \text{19-- Waste Disposal}}{\text{1987 Waste Disposal}} \times 100$$

where "Waste Disposal" is measured in tonnes.

This formula is used to determine the effect of diversion on remaining landfill capacity. Individual IC&I organizations also can use it to determine the success of their internal diversion programs.

The movement of waste and recoverable materials through a waste management system can also be monitored. The waste management system can be viewed as a network of "streams" of waste and recoverable materials beginning at the source of generation, and moving through collection, processing, and disposal. The rate, magnitude and direction of movement are dimensions of the waste management system which may be measured. Different stakeholders have their own monitoring requirements such as the need for identifying efficiency improvements through waste reduction or to help in the sizing of facilities. From the Province's perspective, the monitoring of waste and material streams will help in the implementation of waste diversion initiatives aimed at diminishing the use of disposal facilities. With that goal in mind, municipal and private waste managers will be required by regulations now under consideration to report quantities of waste received at disposal facilities. These reports will provide details about the successes of specific waste diversion initiatives and programs.

Diversion opportunities and priorities will also vary according to the different types of materials involved. The data reported by waste disposal facilities will need to identify the composition of the waste stream received for disposal, in order to indicate the effectiveness of efforts to divert particular classes of material. To ensure that each

disposal facility classifies materials in the same way, the Ministry led a task force of municipal and IC&I representatives in developing a list of "Standard Material Classes." The Province's classification system need not replace the categories now used by municipalities and private waste managers. Rather, it provides a simple way to translate their own information into a common format used across the province. Thus stakeholders can evaluate quantities of materials still available for diversion, and indicate the types of materials recovery facilities or other diversion initiatives still required.

The data reports are part of a waste management information system now being developed by the Ministry. It includes a database to record disposal data, successful diversion initiatives and relevant municipal and facility information. Municipalities will be required to submit periodic data reports to the Ministry. The Ministry is also developing models to estimate disposal for those facilities without weigh scales or estimating techniques.

The data will be used to calculate the provincial diversion rates, assist in creating waste management system plans, and allocate support for market development and waste exchanges.

The Ministry continues to support municipalities and private waste managers by providing technical outreach and funding support programs.

Ontarians, working together, can develop a conserver society, by becoming leaders in developing ways to minimize waste and maximize secondary resource usage.

TABLE OF CONTENTS

EXECUTIVE SUMMARY

1.0 INTRODUCTION

1.1 Purpose 1
1.2 Waste Reduction Office *Initiatives Paper Series* 1
1.3 Ontario's Waste Reduction Targets 2
1.4 Trends in Disposal and Diversion 3

2.0 INTERPRETING THE PROVINCIAL WASTE REDUCTION TARGETS 3

3.0 FACTORS AFFECTING MEASUREMENT OF WASTE DIVERSION 5

4.0 TWO WAYS OF MEASURING PROGRESS TOWARDS THE WASTE REDUCTION TARGETS

4.1 Per Capita Diversion Rate 5
4.2 Absolute Diversion Rate 6

5.0 UNITS OF MEASURE 6

6.0 APPLICATION OF THE WASTE DIVERSION FORMULAE

6.1 Monitoring Diversion for the Province 7
6.2 Municipalities Monitoring Progress 7
6.3 IC&I Organizations Monitoring Diversion 7

7.0 WASTE MANAGEMENT SYSTEM MONITORING 8

8.0 TOWARDS A WASTE MANAGEMENT INFORMATION SYSTEM

8.1 Standard Material Classes 11
8.2 Data Collection 11
8.3 Database 12

8.4	Waste Diversion Information System (WDIS)	12
8.5	Forecasting Models	13
8.6	Communicating Progress	13
9.0	CONCLUSION	14
	APPENDICES	
Appendix I	Standard Material Classes	15
	FIGURES	
Figure 1	Illustrative Trends in Disposal and Diversion	4
Figure 2	Waste Management System Monitoring Model	9

1.0 INTRODUCTION

1.1 Purpose

The paper addresses requests from municipal and industrial, commercial and institutional (IC&I) sectors for guidance on monitoring the attainment of the provincial waste diversion targets of at least 25 per cent in 1992 and at least 50 per cent by 2000. The paper provides information which can be applied as follows:

- As a means to evaluate progress in waste reduction against the provincial targets, both at the provincial and municipal levels;
- As a tool for use in planning and sizing waste management and material recovery facilities;
- As guidelines for the private sector to plan initiatives to reduce waste identified in waste audits; and
- As guidelines for the private sector to plan initiatives to reduce packaging wastes.

The Ministry encourages all those involved in waste management activities to use the methods outlined in this document to monitor and measure waste diversion. Adopting standard methods of measurement helps provide a consistent basis for assessing diversion achievements. The methods are an effective tool for the planning of waste management systems and can be used to identify the opportunities for material recovery programs.

1.2 Waste Reduction Office *Initiatives Papers* Series

This publication is the fourth in a series of *Initiatives Papers* describing the provincial government's waste reduction policies, activities and directions. It provides an interpretation of the provincial waste reduction targets, a list of standard material classes, confirms units of measure, explains the application of the targets, and gives an overview of a waste management information system. The paper was prepared by the Waste Reduction Office of the Ministry of the Environment, following discussions with municipal, federal, provincial, and private sector waste managers and environmental officials. Previous publications in the *Initiatives Papers* series include:

Initiatives Paper No. 1: *Regulatory Measures to Achieve Ontario's Waste Reduction Targets,* October 1991

Initiatives Paper No. 2: *Waste Management Planning In Ontario* March 1992.

Municipal Waste Management Powers: A Discussion Paper, issued by the Ministry of Municipal Affairs in conjunction with the Ministry of the Environment, March 1992.

1.3 Ontario's Waste Reduction Targets

The Government of Ontario has established targets to decrease the amount of waste going to disposal by at least 25 per cent in 1992 and at least 50 per cent by the year 2000 compared to the amount of waste disposal for the base year of 1987. The targets are intended to encourage Ontario's move towards a "conserver society" and to manage the province's secondary resources through application of the 3Rs -- reduction, reuse and recycling. Achieving the targets will indicate progress towards these objectives.

Initiatives Paper No. 1 describes the first set of proposed regulatory measures which were part of the *Waste Reduction Action Plan* announced by the Minister of the Environment in February 1991. The measures provide a regulatory foundation for a consistent approach to achieving the province's waste reduction targets. These regulatory measures, expected to be announced by the end of 1992, will address the following issues:

- Preparation of waste audits and implementation of waste reduction workplans by IC&I organizations;
- Establishment and operation of source separation programs by IC&I organizations and municipalities; and
- Simplification of the approvals process for 3Rs facilities.

Monitoring progress relative to the targets will help evaluate the impact of these regulations and identify the need for other 3Rs initiatives.

Initiatives Paper No. 2 describes changes to the current waste management planning program that would introduce an integrated "two stream" planning and approvals process for waste management systems. One planning stream is aimed at establishing a "Waste Diversion System" which can begin implementation even as the second planning and approvals stream is underway for the "Waste Disposal System." The Province's waste reduction targets, if adopted as planning objectives, have significant implications for the sizing and the design of the overall waste management system. Initiatives Paper No. 2 was released for public consultation together with a discussion paper on municipal waste management powers.

1.4 Trends in Disposal and Diversion

Figure 1, "Illustrative Trends in Disposal and Diversion", indicates the significant quantity of materials which must be diverted from disposal if the targets are to be met. The diagram is a simplification of reality, based on gross estimates and projections, developed as an aid to illustrating relationships between some key concepts.

The dashed line represents the amount of waste going to disposal in per capita rates (tonnes/person/year) as a percentage of the 1987 base year. Various waste composition analyses indicate that annual per capita disposal rate continued to increase until 1987. Subsequently, disposal rates have decreased partly as a result of municipal 3Rs programs.

Above the dashed line is a shaded area labelled "Existing Diversion". It represents the unknown per capita rate of used materials which have been absorbed back into the economy through "traditional" 3Rs activities existing long before 1987 and expected to continue into the future. Examples of such activities include scrap metal salvaging, refillable soft drink containers, and second-hand stores.

Without any new diversion activities, however, the dashed line is likely to continue in an upward trend. The solid line, which begins to emerge after 1987, depicts the *maximum* desirable per capita rates of disposal. The area labelled "New Diversion" represents additional 3Rs activities needed to achieve the provincial waste reduction targets. It also represents the future potential of a secondary materials industry as a growing economic sector. The Ministry's funding and support programs are designed to maintain the existing diversion activities while maximizing development of the new diversion activities.

2.0 INTERPRETING THE PROVINCIAL WASTE REDUCTION TARGETS

Ontario's targets state that the amount of solid waste going to disposal must be reduced by at least 25 per cent in 1992 and by at least 50 per cent by the year 2000. The Ministry calculates attainment of the targets at a provincial level and monitors waste diverted from disposal against the 1987 base year.

The targets apply to municipal solid waste, which includes all solid non-hazardous materials from all sources in Ontario from both the residential and IC&I sectors. Disposal includes materials sent to landfills, dumps and incinerators, including those located outside Ontario.

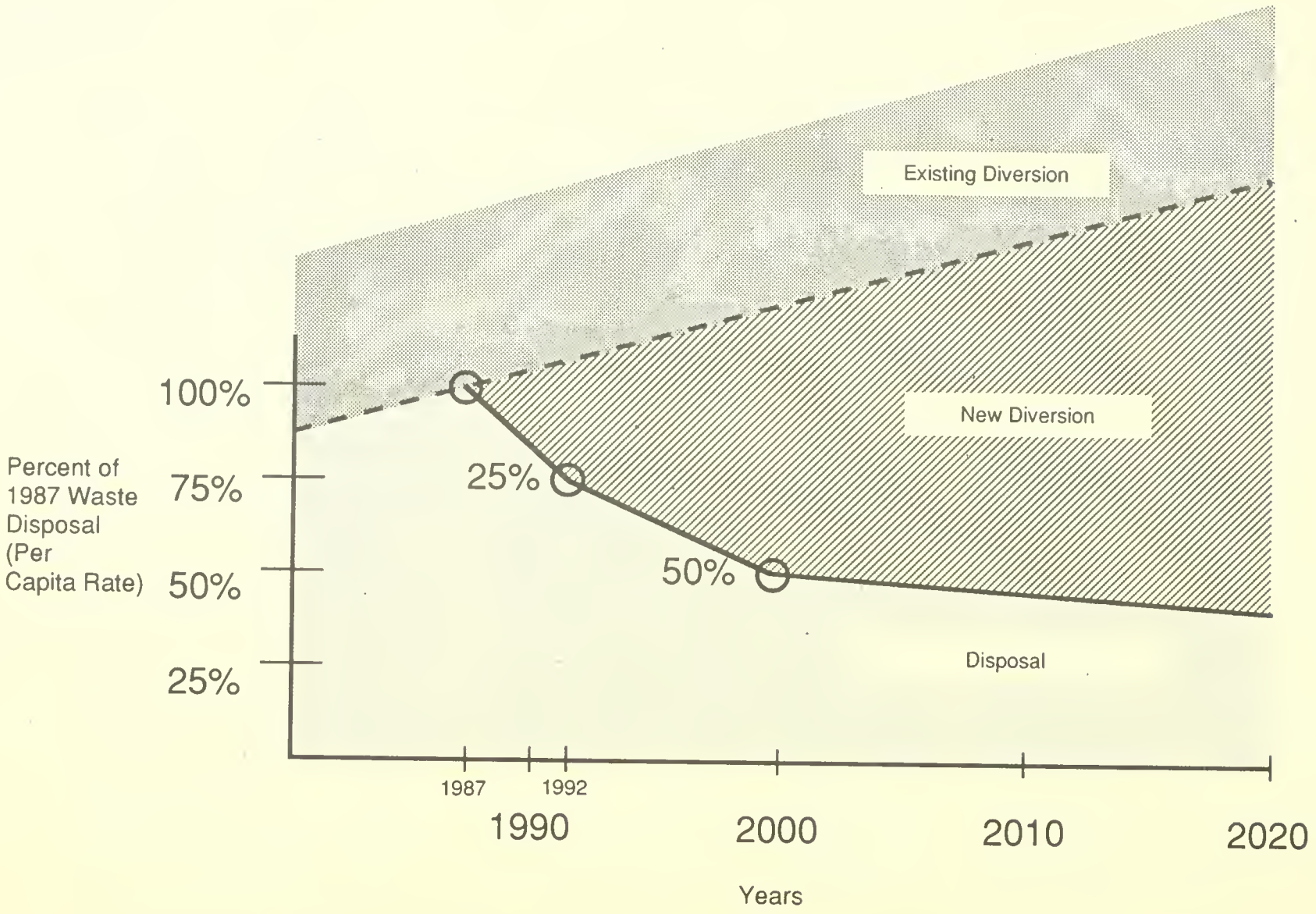


Figure 1: Illustrative Trends in Diversion and Disposal

3.0 FACTORS AFFECTING MEASUREMENT OF WASTE DIVERSION

The amount of materials diverted from disposal is difficult to measure, and is subject to many complex variables such as shifts in population, employment, industrialization, economic growth, and international markets. To measure diversion from disposal, one has to measure the changes in the amount of waste going to disposal. Complex demographic and socioeconomic factors cause variations in the disposal of residential waste, while changes in production levels, automation, employee numbers, sales revenues, product design, and markets directly affect the types and quantities of waste generated by IC&I organizations.

As the Ministry develops forecasting models, these variables will be taken into account when reporting diversion figures and developing realistic projections for diversion.

4.0 TWO WAYS OF MEASURING PROGRESS TOWARDS THE WASTE REDUCTION TARGETS

Two ways to measure progress against the targets have been developed. Both formulae are indicators of social change from a "consumer" to a "conserver" society. The *Per Capita Diversion Rate* reflects changes in disposal which take into account the changing population base of the province. The *Absolute Diversion Rate,* based on actual tonnages, provides a way to forecast landfill requirements. An increase in the per capita diversion rate will not necessarily lead to an absolute decrease in the number of tonnes of waste going to disposal if the population rises significantly.

For purposes of monitoring achievement of the province's waste reduction targets, the *Per Capita Diversion Rate* will be used by the Ministry of the Environment.

4.1 Per Capita Diversion Rate

Waste discarded by the residents and enterprises of Ontario varies in quantity with the size of the population living and working in the province. This formula reflects changes in the population base when monitoring diversion. It is calculated as follows:

$$\frac{\dfrac{\text{1987 Waste Disposal}}{\text{1987 Population}} - \dfrac{\text{19-- Waste Disposal}}{\text{19-- Population}}}{\dfrac{\text{1987 Waste Disposal}}{\text{1987 Population}}} \times 100$$

where "Waste Disposal" is measured in tonnes.

The result of the calculation gives the per capita percentage of diversion achieved in any year relative to the level of waste disposal in 1987.

4.2 Absolute Diversion Rate

Landfills do not expand in relation to population or industrial growth. Consequently, using a formula based on population change is inappropriate for landfill planning. Therefore, the absolute diversion rate formula, as shown below, will be used to monitor landfill requirements:

$$\frac{\text{1987 Waste Disposal - 19-- Waste Disposal}}{\text{1987 Waste Disposal}} \times 100$$

where "Waste Disposal" is measured in tonnes.

The result of the calculation gives the rate of diversion in a target year based on the amount of waste generated in 1987 as the reference base.

5.0 UNITS OF MEASURE

The Ministry monitors diversion and disposal by weight. The metric tonne provides a common unit of measure across material types and waste processing methods (e.g. compaction equipment for truck loads and landfills). Tracking weight rather than volume is also appropriate when considering marketing requirements and diversion programs (such as procurement policies and product design). Sales of secondary materials are typically based on weight rather than volume.

While landfill reach capacity by volume rather than weight, it is easier to measure waste going into a landfill by weight. Automated weigh scales record the weight of a truck as it enters and leaves the facility, providing a simple recording mechanism. Tracking volumes is more labour intensive and prone to error. Conversion of tonnes of landfilled material to volumetric measures can be calculated and landfill capacity levels measured.

6.0 APPLICATION OF THE WASTE DIVERSION FORMULAE

The waste reduction targets were established to encourage the diversion of waste from disposal to productive uses for the province as a whole. Since the original announcement of the targets, some municipalities and IC&I organizations have indicated a desire to apply the targets to their waste reduction efforts. The following sections indicate how individual municipalities and IC&I organizations might apply the formulae.

6.1 Monitoring Diversion for the Province

On a province-wide basis, the Ministry will calculate attainment of the targets using the *Per Capita Diversion Rate*. The Ministry is not measuring the attainment of the targets by individual municipalities or IC&I organizations.

6.2 Municipalities Monitoring Diversion

For purposes of consistency, individual municipalities or groups of municipalities (such as a waste management system planning area) may use the *Per Capita Diversion Rate* formula to assess their own performance. This will assist municipal waste management planners to compare local diversion achievements in their planning area to the province as a whole or to other planning areas. On the other hand, waste reduction targets based on an *Absolute Diversion Rate* will assist in the sizing of waste management facilities. Either approach is acceptable as a waste management system planning objective.

6.3 IC&I Organizations Monitoring Diversion

The Ministry recognizes that factors such as changing market share, product mix or automation may make year-by-year comparisons difficult for some IC&I organizations. Similarly, changes in municipal population figures do not proportionately change the amount of waste produced by a business. Therefore, the Ministry is working with IC&I representatives on a task force to determine the appropriate adjustment factors.

In the meantime, an IC&I organization interested in assessing its own performance can apply the *Absolute Diversion Rate* formula.

7.0 WASTE MANAGEMENT SYSTEM MONITORING

A waste management system can be viewed as a network of "streams" of waste and recoverable materials beginning at the source of generation, and moving through collection, processing, and disposal. The rate, magnitude and direction of movement are dimensions of the waste management system which may be measured.

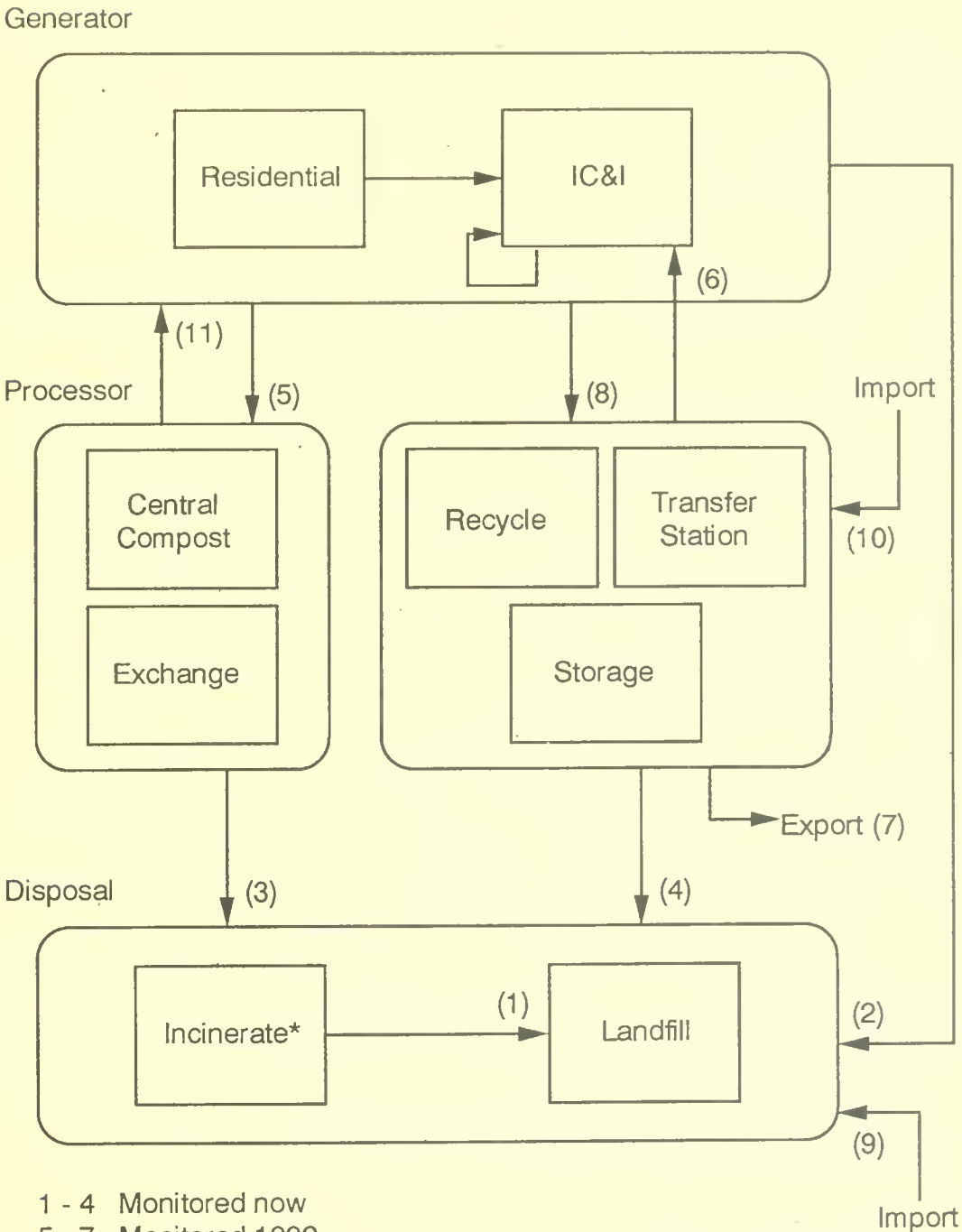
To provide effective support to municipal and IC&I efforts to divert waste from landfill and to achieve the province's waste reduction targets, the Ministry monitors the various streams of waste and recoverable materials. Figure 2, "Waste Management System Monitoring Model", depicts the flow of materials through the waste stream, and identifies key points at which data can be collected. The arrows indicate the flow of wastes and secondary materials; the arrowheads indicate the points at which the flows can be monitored. The boxes indicate the generators, processors and disposers of waste.

Generators: The boxes in the top section of Figure 2 show the sectors that discard materials into the waste stream. Waste generators, including households and IC&I organizations, discard materials that are sent directly to waste disposal facilities (2) or to processing facilities (5, 8). Some material is diverted from the waste stream through on-site composting or through 3Rs initiatives managed by the generators. To implement the province's *Waste Reduction Action Plan*, the Ministry, through its Waste Reduction Office, is developing support programs to help organizations take an audit of their waste and to take steps to reduce it.

Processors: The boxes in the middle section of Figure 2 show the types of facilities that process the waste stream to recover secondary materials. Waste processors receive materials collected by municipalities through the Blue Box or other municipal 3Rs programs, from waste management companies, or directly from individual generators (5, 8, 10). After processing, materials are sold to individual generators (6, 11), or sent for final disposal (3, 4, 7). Waste processors are grouped as follows:

- Central compost facilities process leaf, yard and food wastes collected from residences and IC&I organizations. The resultant material is available to households or IC&I organizations.

- Exchange facilities, such as salvage operations and waste exchanges, provide a mechanism for households and IC&I organizations to trade materials for which no ready market exists. Exchanges may receive materials for subsequent distribution or may act as a broker connecting



1 - 4 Monitored now
5 - 7 Monitored 1992
8 Monitored 1992/93
9 - 11 Monitored 1993

* Existing Facilities only

Figure 2: Waste Management System Monitoring Model

suppliers with customers.

- Recycling facilities process source-separated materials for sale and distribution to markets.

- Storage facilities receive and store source-separated materials that exceed current market demand.

- Transfer stations receive small loads of materials, sort them, and ship large loads to final destination points (disposal facilities or recyclers).

Disposal: The boxes in the bottom section of Figure 2 show the facilities dealing with final disposal of residual waste, e.g. incinerators and landfills. New facilities for the incineration of municipal solid waste have been banned in Ontario, although existing incinerators may continue to operate under stricter environmental control requirements. Incinerator operators are required by the Ministry to measure quantities of materials received as well as residual ash sent for subsequent disposal. Landfills are the ultimate end of the waste stream flow. All residuals from 3Rs activities, business operations, waste processing and incineration are deposited in landfills.

At present, the Ministry monitors materials received at municipally-operated waste disposal facilities (points 1, 2, 3, 4). To get a complete picture of disposal, regulations are being considered to require reporting from disposal and diversion facilities operated by private waste managers (1, 2, 3, 4).

In the future, waste and secondary materials handled by material recovery and central compost facilities also will be tracked (5, 8), as will materials shipped from material recovery facilities to secondary markets (6, 11), exports (7) and imports (9, 10). As more IC&I organizations undertake waste audits, they will build up a comprehensive database that can be shared with organizations specializing in materials exchanges. Participation in such exchanges can lead to significant savings in disposal and other waste management costs.

8.0 TOWARDS A WASTE MANAGEMENT INFORMATION SYSTEM

Progress towards a conserver society can be measured by monitoring materials diverted from disposal. The Ministry of Environment's proposed Waste Management Information System will be a mechanism that allows such monitoring to be performed effectively. In addition to monitoring progress towards diversion targets, the data will be used to assist municipalities and IC&I organizations:

- To identify feasible waste diversion options;
- To identify secondary market opportunities;
- To assist in developing waste management systems plans;
- To support waste exchanges; and
- To develop and evaluate technical and funding support programs.

The system has several components, including: Standard Material Classes, a data collection process, a database to store the disposal and diversion figures, a computer system to process the data (the Waste Diversion Information System), models to estimate and forecast disposal, and a means to communicate progress.

8.1 Standard Material Classes

A task force consisting of representatives from municipalities, the private sector and Environment Canada compiled a list of Standard Material Classes (see *Appendix I*). The Standard Material Classes apply to materials which enter or leave the waste stream, from the point of discard, through source separation, collection and processing, to final marketing of the secondary material and/or disposal. By using Standard Material Classes when reviewing data on disposed or diverted materials, stakeholders will be able to identify material recovery facility and market requirements. The classes were developed to monitor materials sent to disposal and diverted from disposal rather than to specify product requirements. Future enhancements could include categories to address market requirements.

Under the proposed waste reduction regulations, the Standard Material Classes will provide the basis on which waste diversion initiatives can be monitored. The classification system is not intended to replace the material classes currently used by municipalities or IC&I organizations as they may be needed to track materials at a finer level of detail (e.g., light bulbs and window glass).

8.2 Data collection

The waste management system monitoring model specifies the points in the flow of waste and recoverable materials through the system where data can most readily be collected. Regulations to require reporting to the Ministry on the quantities of materials received by waste disposal and diversion facilities are being considered. The regulations would require that both municipal and private owners of waste processing and disposal facilities report the tonnes by

material type (Standard Material Classes) processed by each facility in the reporting period. The reports would also need to indicate the source sector (i.e., residential or IC&I) of the materials.

Reporting period frequencies will vary depending on the size of the municipality and availability of weigh scales.

***Facilities with weigh scales*:** monthly reports where facilities serve municipalities whose population exceeds 100,000; quarterly reports from other facilities.

Facilities without weigh scales: quarterly reports from those facilities which can estimate tonnages. The Ministry will work with municipalities to develop estimates of waste disposed.

The Ministry will calculate estimates of disposal and diversion for the remaining areas (such as unincorporated areas) using the provincial per capita waste disposal rate.

8.3 Database

The Ministry will maintain a database of materials diverted and disposed of by facility, the standard material classes, waste management methods (various 3Rs initiatives and programs for diverting materials from waste disposal), and relevant municipal and facility data. The database also will contain successes published by either municipal or IC&I organizations.

8.4 Waste Diversion Information System (WDIS)

The proposed WDIS comprises a number of computer functions which manage waste diversion data. The functions include:

- Monitoring attainment of the provincial waste reduction targets;
- Maintaining an inventory of waste processing facilities:
- Estimating waste disposal for facilities without weigh scales or estimating models;
- Recording diversion by municipalities against provincial diversion targets;
- Recording diversion by IC&I organizations against waste audits and

workplans and packaging audits and workplans;

- Monitoring 3Rs funding programs;
- Monitor disposal and diversion for waste management system areas; and
- Forecasting waste disposal and diversion for municipalities or waste management system areas.

The Ministry plans to provide direct computer access to WDIS in 1993 in order to minimize the number of printed reports required. Security measures will be in place to protect confidential data pertaining to waste diversion and disposal. In addition, the Ministry will provide the specifications required to exchange data electronically to IC&I organizations or independent software vendors. The Ministry encourages the development of electronic data exchanges both in submitting and retrieving data.

8.5 Forecasting Models

The Ministry is developing methods to estimate 3Rs diversion tonnages. Once these models have been evaluated and tested, they will be published for comment. Waste managers in those areas without weigh scales or other accurate monitoring methods can use the models to estimate disposal and diversion. The forecasting models will be available for use by planners developing waste management system plans or those identifying material recovery facility requirements.

8.6 Communicating Progress

The Ministry will report the provincial diversion and disposal totals on a quarterly basis. Case studies of initiatives that achieve high diversion rates will be published as will other information about diversion opportunities.

The Ministry hopes to improve its communication with municipalities and IC&I sectors and will provide them with the following:

- Reports on disposal and diversion to organizations submitting data;
- Reports showing attainment against provincial targets; and
- Available figures explaining external causes that affected base figures (e.g. recession, free trade, population variances).

9.0 CONCLUSION

To foster greater efforts by the municipal and IC&I sectors to minimize waste, the Ministry continues to provide support through technical outreach, information papers, funding programs, and development of the Waste Diversion Information System.

The Ministry views the management of waste as a significant mechanism for conserving Ontario's resources and environment. Ontarians working together can develop a conserver society and become leaders in developing ways to minimize waste and maximize secondary resource usage.

APPENDIX I - STANDARD MATERIAL CLASSES

CODE	MAJOR CATEGORY	SUB CATEGORY	EXAMPLES
400	Glass	Clear Beverage	Clear wine bottle, juice bottle
410		Coloured Beverage	Beer Bottle, Coloured wine bottle
420		Mixed Beverage	Clear and coloured bottles
430		Clear Container	Jam jars, pickle bottles
440		Coloured Container	
480		Mixed Glass	Comingled glass container & beverage
490		Other Glass	Heat resistant glass, laminated glass, wired glass, mirrors, plate glass, mineral wool, wool glass, light bulbs or tubes, glass blocks or brick, insulators
499		Composite Glass	Predominantly glass
500	Paper	Corrugated	Corrugated, old boxes, corrugated new cuttings
510		News Print	News, printed (old and overissued) unprinted, other groundwood, sulphate
520		Boxboard	Boxboard cuttings, mill wrappings
530		Fine Paper	Office, computer, ledger
580		Mixed Paper	Comingled classified paper
590		Other Paper	Kraft, magazines, coated paper, carbon paper
599		Composite Paper	Predominantly paper
600	Wood (Processed)	Packaging	Pallets, skids, crates
610		Mfg Residual	Offcuts, chips, shavings, sander dust, sawdust
620		Building Material	Veneer, lathing, flooring, doors, frames, lumber, forms, mouldings
680		Mixed Wood	Comingled classified wood
690		Other Wood	Treated wood, painted wood, plywood, chipboard, particleboard
699		Composite Wood	Predominantly wood
700	Vegetation	Leaf & Yard	Hay, straw, grass clippings
710		Brush	
720		Stumps	
780		Mixed Vegetation	Comingled vegetation
790		Other Vegetation	Non-classified vegetation
799		Composite Vegetation	Predominantly vegetation

CODE	MAJOR CATEGORY	SUB CATEGORY	EXAMPLES
800	Food	Fruit/Vegetables	
810		Protein	Meat, Fish, Poultry
820		Fats/Oils	
830		Grain Dust	
840		Bones	Carcasses
880		Mixed Food	Comingled food
890		Other Food	Stale dated food, condemned food
899		Composite Food	Predominantly Food
900	Metal	Ferrous Metal	Iron, steel (e.g. magnetic)
910		Aluminum	Cans, car parts, poil, wiring, tubes
980		Mixed Metal	
990		Other Non-ferrous Metal	Brass, lead, copper
999		Composite Metal	Predominantly metal
1000	Plastic	PET	2 litre plastic soft drink bottles, plastic liquor bottles, some vegetable oil and bottled water bottles.
1010		Other Thermoplastic	HDPE (milk jugs, large food tubs, motor oil bottles, most shampoo bottles, "krinkly" grocery bags, plastic pails). LDPE (shiny grocery bags, most grocery bags, plastic container lids, bread bags). PP (margarine and yogurt tubs, small tubs, syrup bottles). PS ("formed" disposable cups and plates, fragile clear plastic cups), PS is used for all disposable packages cutlery etc. used by fast food chains.
1020		Thermoset Plastic	ABS e.g. computer and telephone housings. PVC e.g. sewer & water pipes, some house d\siding, floor and wall covering, some consumer bottles.
1080		Mixed Plastic	Comingled plastic
1099		Composite Plastic	Predominantly plastic
1100	Textile/Fabric	Natural Fibre	Wool, cotton, linen, leather
1110		Manmade Fibre	Nylon, acrylic, polyester
1180		Mixed Textile	Comingled classified textile
1199		Composite Textile	Predominantly textile/fabric

CODE	MAJOR CATEGORY	SUB CATEGORY	EXAMPLES
1200	Rubber	Tires	
1210		Hose, Belting	
1220		Foam	Carpet underlay
1230		Rigid	Shoes, auto mounts
1240		Sheet	Innertubes, floor mat
1280		Mixed Rubber	Comingled classified rubber
1290		Other Rubber	Non-classified rubber
1299		Composite Rubber	Predominantly rubber
1399	Asphalt	Composite Asphalt	Predominantly asphalt
1499	Drywall	Composite Drywall	Predominantly Drywall
1500	Earth Material	Soil	Clay, sand, dirt
1510		Aggregate	Gravel, rock
1520		Concrete Products	Concrete, plaster, rubble
1580		Mixed Earth	Comingled earth material
1590		Other Earth Material	Non-classified earth material
1599		Composite Earth Material	Catch Basin Cleanings, Street Sweepings
1600	Ash	Fly Ash	
1610		Bottom Ash	
1680		Mixed Ash	Comingled ash
1699		Composite Ash	Predominantly ash
1799	Asbestos	Composite Asbestos	Predominantly asbestos
1899	Sludge/Filter Cake	Composite Sludge	Predominantly sludge
1900	Composite Materials	Electronical Equipment	T.V., Stove, fridge, microwave, stereo, motors
1910		Furniture	Table, chair, bed
1930		Diapers	
1940		Household Hazardous Waste	Batteries, paints/solvents, household cleaners, motor oil
1970		Mixed Dry Waste	Comingled dry materials
1975		Mixed Wet Waste	Comingled wet materials
1980		Mixed Solid Waste	Mixed materials (wet & dry)